

- **PLANNING, LOCATION AND POSITION**
- POSITION AND ORIENTATION OF THE SUBSTATION SHALL BE AGREED WITH UK POWER NETWORKS PRIOR TO THE COMMENCEMENT OF ANY BUILDING WORKS ON SITE.
- SUBSTATIONS SHALL BE LOCATED ADJACENT TO A PUBLIC HIGHWAY OR REACHED BY A PRIVATE DEDICATED ACCESS WAY WITH FULL CONTROL AND ASSOCIATED LEGAL RIGHTS.
- THE DEVELOPER IS RESPONSIBLE FOR OBTAINING ALL PLANNING CONSENTS AND BUILDING REGULATION APPROVALS.
- UNIMPEDED ACCESS FOR UK POWER NETWORKS PERSONNEL IS REQUIRED AT ALL TIMES. 365 DAYS OF THE YEAR (24/7). ANY DOORS OR GATES ON THE ACCESS ROUTE SHALL BE LOCKED WITH THE STANDARD UK POWER NETWORKS LOCKING SUITE, 24 HOURS A DAY.
- PROPOSED SOFT LANDSCAPING ADJACENT TO THE SUBSTATION (E.G. PLANTING SCHEMES) SHALL ALLOW FOR FUTURE PLANT GROWTH WITHOUT COMPROMISING ACCESS OR VENTILATION THROUGH DOORS AND LOUNRES.
- GRID SUBSTATIONS SHALL BE SITED AT LEAST 40M AWAY FROM THE NEAREST BUILDING UNLESS A 4HR FIRE BARRIER IS LOCATED IN BETWEEN.

- FOUNDATION AND REINFORCED CONCRETE**
- AS STATED ON DRAWING OR TO SUIT THE SITE CONDITION.
  - SUFFICIENT COVER TO THE REINFORCEMENT TO ACHIEVE A 4 HOUR FIRE RATING (50mm MINIMUM).
  - FOR PRELIMINARY DESIGN, ASSUME 50kN/m<sup>2</sup> INCREASE IN GROUND PRESSURE AT FORMATION LEVEL.
  - STRUCTURAL CONCRETE TO BE POURED ON 50mm GEN1 MIX CONCRETE BLINDING ON 1200 GAUGE GEOMEMBRANE, ON SAND BLINDING, ON WELL COMPACTED Dp1 TYPE MATERIAL.
  - REINFORCING BARS TO BE ELECTRICALLY CONTINUOUS.

- FLOOR SLAB**
- TO THE STRUCTURAL ENGINEER'S SPECIFICATIONS TO SUSTAIN LOADS SHOWN. THE ENTIRE ACCESS ROUTE IS TO BE CAPABLE OF SUSTAINING THE EQUIPMENT LOAD.
  - STANDARD FLOOR SLAB THICKNESS OF 225mm MINIMUM REINFORCED CONCRETE WITH A SUITABLE WEARING SCREED WITH A MINIMUM COMPRESSIVE STRENGTH OF 40N/mm<sup>2</sup> AFTER 28 DAYS. CONCRETE WORKS FINISHED WITH STEEL FLOAT TO WITHIN +/-2mm OVER 2000mm.
  - REINFORCEMENT TO DEVELOPER'S STRUCTURAL ENGINEER'S REQUIREMENTS.

- **GRP ENCLOSURE**
- SUPPLIED AND INSTALLED BY UK POWER NETWORKS. USUALLY DELIVERED ASSEMBLED. FLAT PACK UNITS ARE AVAILABLE ON REQUEST.
- TOTAL WEIGHT OF GRP ENCLOSURE IS 600kg
- THREE WAY LOCKING DEVICE WITH FREE ISSUED UK POWER NETWORKS PADLOCK
- THE THRESHOLD SECTION BELOW THE DOORS IS REMOVABLE TO FACILITATE PLANT MOVEMENT.
- KEEP 1000mm CLEARANCE MINIMUM ABOVE ENCLOSURE FOR PRESSURE RELIEF AT ALL TIMES.
- ALLOW 6500mm CLEAR HEADROOM FOR THE REMOVAL OF THE ENCLOSURE DURING MAINTENANCE OR REPLACEMENT OF THE TRANSFORMER.
- MAXIMUM LOAD ON ROOF TO BE 2.5kN/m<sup>2</sup>.
- LOUVERED VENTS SHALL NOT BE OBSTRUCTED; A MINIMUM CLEAR AREA OF 500mm<sup>2</sup> IS REQUIRED AROUND THE VENTS.
- STANDARD COLOURS ARE MID BROWN 08-25 OR DARK GREEN 14-39 TO BS8480.

- DUCTS**
- 125mm INTERNAL DIAMETER TWIN WALLED HIGH DENSITY POLYETHYLENE DUCTING TO ESI 12-24 OR BS EN 61386, LAID FLAT AND LEVEL.
  - NUMBER AND ENTRY POSITIONS SHALL BE VERIFIED BY UK POWER NETWORKS.

- INFILL TO AREA AROUND CABLES**
- AFTER CABLE INSTALLATION, SEAL ALL CABLE DUCTS, FILL TRENCHES WITH SAND WITH 100mm ABOVE TOP DUCT AND TO A MINIMUM OF 500mm BELOW THE TOP OF GRATINGS.

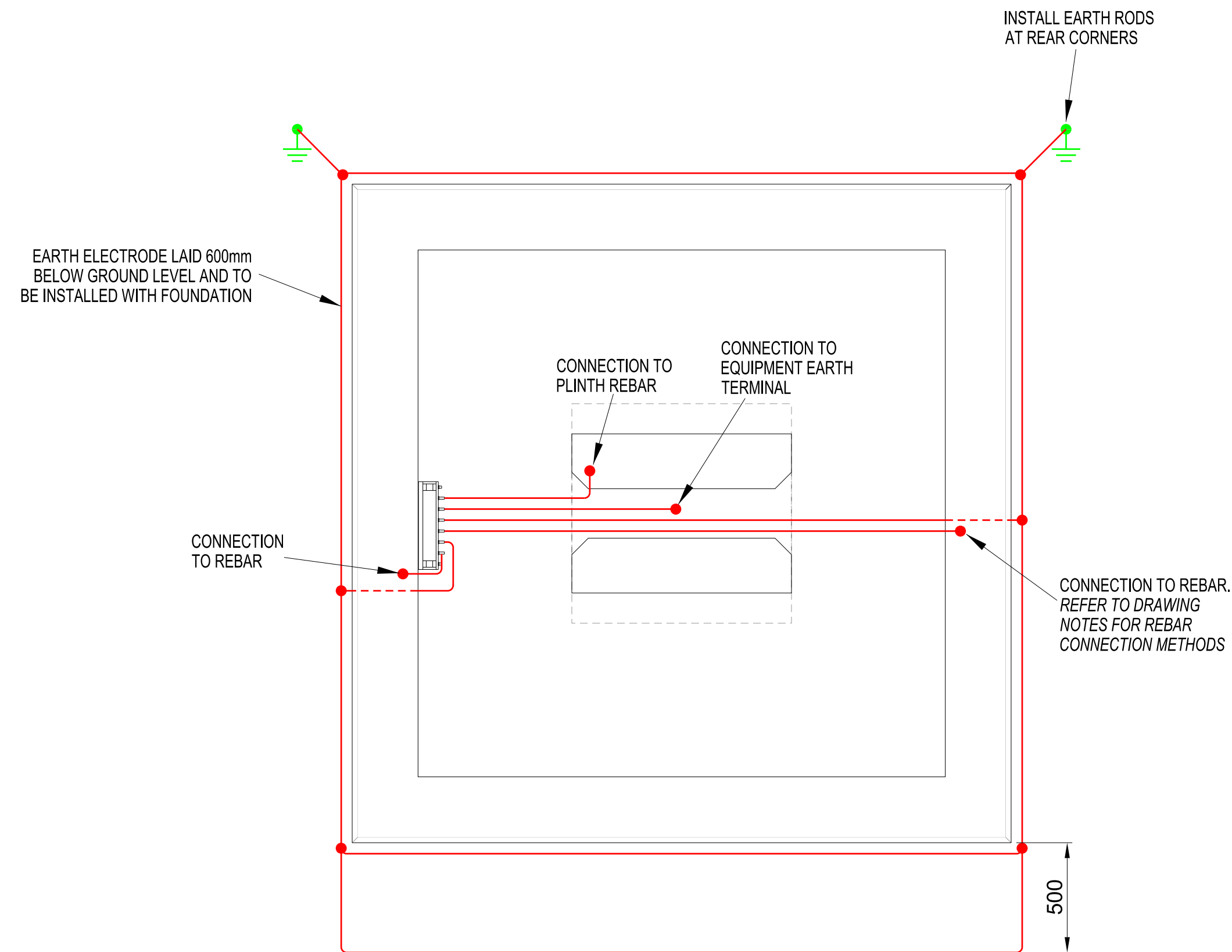
- GRP GRATINGS AND SUPPORTS**
- USE APPROVED 38mm DEEP MOULDED GRP GRATINGS; OPEN TYPE WITH GRITTED SURFACE AND COLOUR GREEN.
  - GRATING SHALL BE FLUSH WITH TOP OF FOUNDATION AND SECURELY SUPPORTED, SEATED LEVEL WITH NO NOTICEABLE ROCKING OR SLIDING.
  - CUT OFF OPENINGS FOR CABLE PENETRATIONS ENSURING THE GRATINGS CAN BE REMOVED WITH CABLES IN-SITU WHILE STILL REMAINING STABLE.
  - STEELWORK FOR GRP GRATINGS SUPPORTS SHALL BE GALVANISED.

- | REFERENCES  |   |
|-------------|---|
| SHEET 2     | EARTHING LAYOUT                                   |
| SHEET 3     | SMALL POWER AND LIGHTING LAYOUT                   |
| EAS 07-0000 | APPROVED EQUIPMENT LIST - CIVIL                   |
| EAS 02-0000 | APPROVED EQUIPMENT LIST - CABLES & DUCTS          |
| EDS 07-0119 | SUBSTATION ELECTRICAL SERVICES                    |
| EDS 07-3101 | PRE-DESIGN REQUIREMENTS FOR SECONDARY SUBSTATIONS |
| EDS 07-3102 | SECONDARY SUBSTATION CIVIL DESIGN STANDARD        |

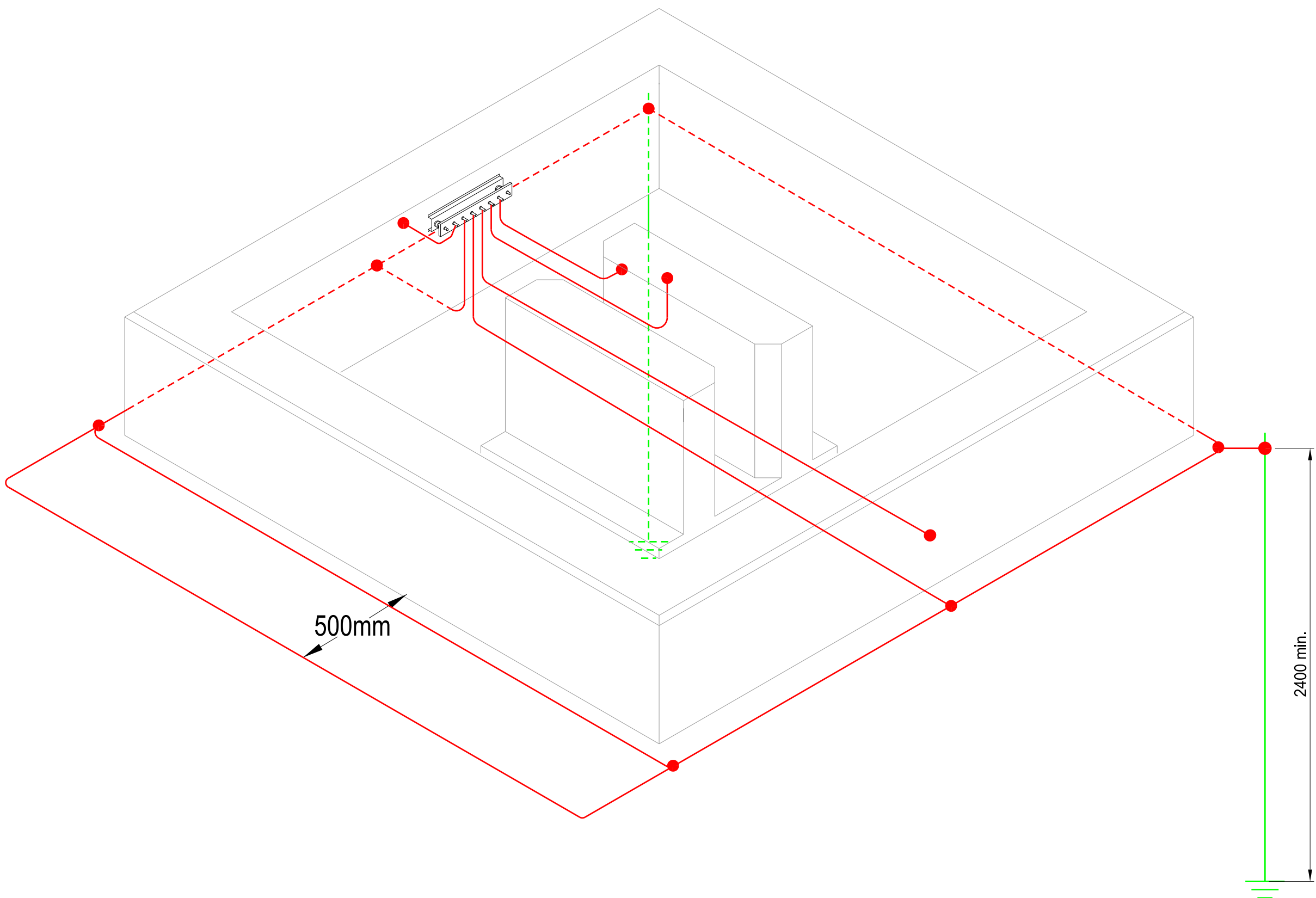
- EQUIPMENT WHICH MAY BE USED WITH THIS DESIGN**  
• RMU ONLY



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DRAWING NO. EDS 07-3102.05 Sheet 1 of 3			



PLAN VIEW



ISOMETRIC VIEW

**GENERAL NOTES**

- THIS DRAWING SHALL NOT BE SCALED AND NO VARIATION TO THE STATED DIMENSIONS OR MATERIALS SPECIFIED SHALL BE PERMITTED WITHOUT PRIOR WRITTEN CONSENT FROM UK POWER NETWORKS.
- ALL DIMENSIONS ARE IN MILLIMETRES.
- THE EARTHING SYSTEM SHALL BE PROVIDED BY THE DEVELOPER/CONTRACTOR UNLESS STATED OTHERWISE BY UK POWER NETWORKS.
- WHEREVER POSSIBLE THE EARTHING SYSTEM SHOULD BE INSTALLED IN ASSOCIATION WITH THE GROUND WORKS TO ENSURE THAT EARTH ELECTRODES ARE CORRECTLY POSITIONED PRIOR TO PLACEMENT OF CONCRETE.

**REBAR/MESH REINFORCEMENT**

- THE CONNECTION TO THE REINFORCEMENT WITHIN THE PLINTH SHALL USE EXOTHERMIC WELDING OR SUITABLE CLAMPS.
- ALL CONNECTIONS TO THE REINFORCEMENT SHALL USE A MINIMUM OF 70mm<sup>2</sup> STRANDED HARD DRAWN COPPER CABLE OR 25mm x 3mm COPPER TAPE.

**EARTH CONDUCTOR, ELECTRODE & RODS**

- THE EARTH RODS SHALL BE COPPER CLAD WITH APPROPRIATE FITTINGS, DRIVEN TO A MINIMUM DEPTH OF 2.4m.
- ALL EARTH ELECTRODE CONDUCTOR AND ELECTRODE SHALL BE AS FOLLOWS:
- FOR EARTH FAULT LEVELS UP TO 8kA USE 70mm<sup>2</sup> BARE STRANDED HARD DRAWN COPPER CABLE OR 25mm x 3mm COPPER TAPE.
- FOR EARTH FAULT LEVELS UP TO 12kA USE 120mm<sup>2</sup> OR 2 x 70mm<sup>2</sup> BARE STRANDED HARD DRAWN COPPER CABLE OR 25mm x 4mm COPPER TAPE.
- FOR EARTH FAULT LEVELS UP TO 15kA USE 2 x 70mm<sup>2</sup> BARE STRANDED HARD DRAWN COPPER CABLE OR 25mm x 6mm COPPER TAPE.

**EARTH RESISTANCE**

- THE MAXIMUM RESISTANCE OF THE STANDALONE EARTHING SYSTEM SHALL BE SPECIFIED BY THE UK POWER NETWORKS DESIGNER.
- WHERE THE EARTHING SYSTEM IS INSTALLED BY A DEVELOPER OR CONTRACTOR CERTIFICATION CONFIRMING THE RESISTANCE OF THE STANDALONE EARTHING SYSTEM SHALL BE PROVIDED TO UK POWER NETWORKS PRIOR TO EQUIPMENT INSTALLATION.

**BONDING**

- NOT ALL EQUIPMENT BONDING IS SHOWN ON THE DRAWING. ALL EQUIPMENT SHALL BE BONDED IN ACCORDANCE WITH ECS 06-0023.

**OTHER**

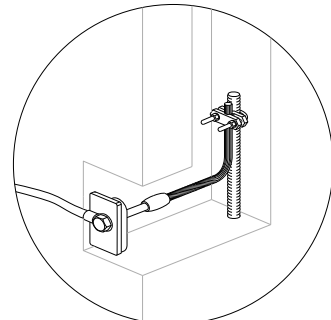
- A 6-WAY EARTH BAR SHALL BE PROVIDED IN THE POSITION SHOWN ATTACHED TO THE PLINTH AROUND 100mm BELOW FFL.
- THE EARTHING SYSTEM IS INSTALLED FOR UK POWER NETWORKS' SOLE USE AND SHALL NOT BE INTERCONNECTED WITH ANOTHER EARTHING SYSTEM OR USED FOR ANY OTHER PURPOSE WITHOUT PERMISSION FROM UK POWER NETWORKS.

**FURTHER INFORMATION**

- FOR FURTHER DETAILS ON THE CONSTRUCTION OF THIS EARTHING SYSTEM INCLUDING MATERIALS, CONNECTIONS, LABELLING ETC. REFER TO ECS 06-0023.
- FOR INFORMATION ON SECONDARY SUBSTATION EARTHING DESIGN REFER TO EDS 06-0014.

**NOTE: THIS DRAWING ONLY SHOWS THE EARTHING ASSOCIATED WITH THE GROUND WORKS. ADDITIONAL EARTHING MAY BE REQUIRED TO ACHIEVE THE EARTH RESISTANCE VALUE AND TO ENSURE THE SUBSTATION IS SAFE. REFER TO THE RELEVANT EARTHING STANDARD FOR THE COMPLETE EARTHING AND BONDING REQUIREMENTS.**

REBAR/EARTH CONNECTION METHOD  
DETAIL

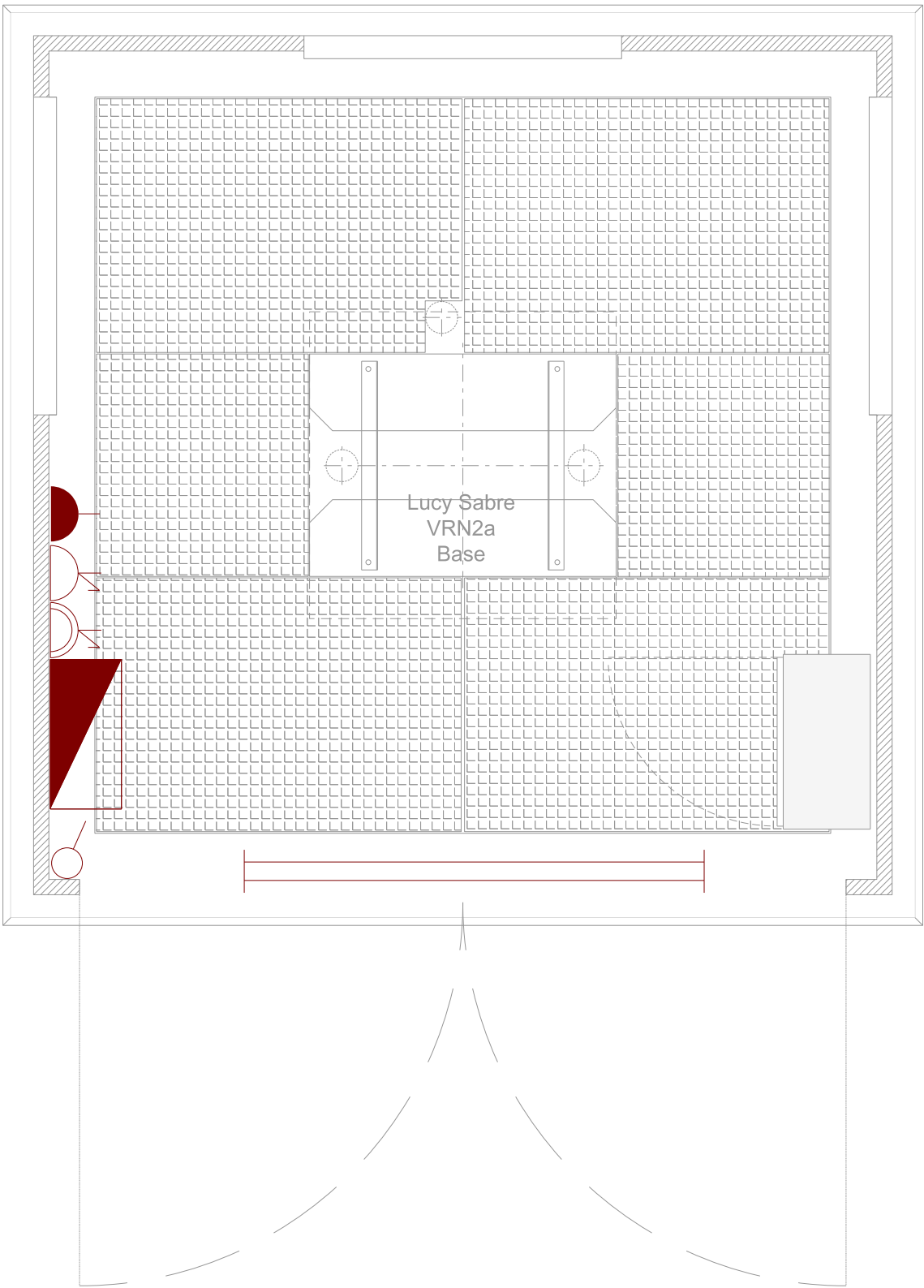


EARTH POINT CONNECTED TO REBAR OR REINFORCEMENT MESH WITH CLAMPS OR EXOTHERMIC WELDING.

EARTHING KEY	
	EARTH ROD
	EARTH ELECTRODE
	CONNECTION

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Version	Date	Description	Checked	Dm.
			Approved	Designed
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TITLE				
RING MAIN UNIT PLINTH DESIGN WITH GRP ENCLOSURE EARTHING LAYOUT				
SCALE	N.T.S.	@ A1	APPROVED	Version
DRAWING NO.				A
EDS 07-3102.05		Sheet 2 of 3		
SITE				
SECONDARY SITES				





**KEY:**  
(SEE NOTES FOR EQUIPMENT DETAILS)


 TWIN FLUORESCENT LUMINAIRE

 13A UNSWITCHED FUSED SPUR FOR RTU

 13A SWITCHED SINGLE SOCKET LABELLED FOR TEST EQUIPMENT

 13A SWITCHED DOUBLE SOCKET

 LIGHT SWITCH

 CONSUMER UNIT

- GENERAL NOTES**
- DO NOT SCALE FROM THIS DRAWING. NO VARIATION TO THE STATED DIMENSIONS OR MATERIALS SPECIFIED WILL BE PERMITTED WITHOUT PRIOR WRITTEN CONSENT FROM UK POWER NETWORKS. ALL DIMENSIONS ARE IN MILLIMETRES.
  - THE RUNNING OF HEATING, GAS, TELECOMS, WATER AND OTHER SERVICES THROUGH OR UNDER THE SUBSTATION AREA IS NOT PERMITTED.
  - WORKMANSHIP AND MATERIALS TO CONFORM TO THE LATEST EDITION OF THE RELEVANT CODES OF PRACTICE OR BRITISH STANDARD AND EUROCODES.
  - THE LIGHTING AND POWER REQUIREMENTS ARE SUMMARISED BELOW. REFER TO EDS 07-0119 FOR FURTHER DETAILS.
  - ALL WORK AND TESTING SHALL BE CARRIED OUT BY SUITABLY COMPETENT OPERATIVES IN ACCORDANCE WITH BS 7671.
  - ALL ACCESSORIES AND ACCESSORY MOUNTING BOXES OR ENCLOSURES SHALL BE IP56 SURFACE MOUNTED FROM THE MK MASTERSEAL RANGE OR EQUIVALENT.

- POWER SUPPLY OPTIONS**
- MINIMUM 4mm<sup>2</sup> SWA FROM THE LV CABINET/BOARD 32A AUXILIARY SUPPLY TERMINALS OR 35mm<sup>2</sup> SERVICE FROM LV PILLAR OR LV DISTRIBUTION NETWORK. ALL SUPPLIES SHALL BE TERMINATED IN A 100A CUT-OUT FUSED AT 50A.

- DISTRIBUTION BOARD**
- THE DISTRIBUTION BOARD SHALL BE INSULATED SINGLE-PHASE AND NEUTRAL (TO BS EN 61439-3) WITH A MINIMUM OF 5 WAYS AND INCLUDE:
    - A 100A/125A DOUBLE-POLE (PHASE AND NEUTRAL) DISCONNECTOR WITH 15kA BREAKING CAPACITY (TO BS EN 60947).
    - RCBOs (TO BS EN 61009-1) AND MCBs (TO BS EN 60898-2) WITH 15kA BREAKING CAPACITY.
    - 16/25A RCBO FOR THE 13A SOCKET OUTLET CIRCUIT.
    - 16A MCB FOR THE TEST EQUIPMENT 13A SOCKET OUTLET.
    - 6/10A MCB FOR THE LIGHTING CIRCUIT.
    - 6A MCB FOR EACH RTU OR PLTU (IF INSTALLED).
    - A SPARE WAY COMPLETE WITH BLANKING PLATE FOR FUTURE USE.
  - THE DISTRIBUTION BOARD SHALL BE MOUNTED AT A HEIGHT OF 1350mm TO 1450mm ABOVE FINISHED FLOOR LEVEL.

- INTERNAL LIGHTING**
- THE SUBSTATION SHALL A MINIMUM OF ONE LIGHT FITTING ABOVE THE DOOR. IF REQUIRED ADDITIONAL LIGHT FITTINGS SHALL BE INSTALLED TO PROVIDE ADEQUATE LUMINANCE TO ALL AREAS.
  - THE LIGHT FITTINGS SHALL BE POSITIONED TO AVOID SHADOWS WHEN EQUIPMENT DOORS ARE OPEN.
  - ALL LIGHT FITTINGS SHALL BE MOUNTED AT A MAXIMUM HEIGHT OF 2200mm ABOVE FINISHED FLOOR LEVEL AND BE POSITIONED TO AID FUTURE MAINTENANCE. LIGHT FITTINGS SHALL NOT BE INSTALLED ABOVE AN LV BOARD.
  - GENERAL PURPOSE LIGHT FITTINGS SHALL BE OF THE FLUORESCENT IMPACT AND CORROSION RESISTANT TYPE, CORROSION RESISTANT WITH A POLYCARBONATE PRISMATIC DIFFUSER (TO BS EN 60598-1) AND SHALL HAVE A MINIMUM DEGREE OF PROTECTION OF IP56. THE PREFERRED SIZE IS A 1500mm TWIN LAMP FITTING.
  - LIGHT FITTINGS SHALL BE FITTED WITH 35W OR 49W T5 OR T16 LINEAR FLUORESCENT TUBES OF THE HIGH FREQUENCY ENERGY EFFICIENT TYPE (TO BS EN 60081) OR EQUIVALENT LED. ALL LAMPS SHALL HAVE CAPS OF THE 'BI' PIN TYPE AND A MINIMUM COLOUR TEMPERATURE OF 3500K (A WHITE APPEARANCE).
  - LIGHT FITTINGS SHOULD BE CONNECTED VIA A PLUG IN ROSE (OR SIMILAR) TO AID FUTURE MAINTENANCE. A PROTECTIVE CONDUCTOR SHALL BE CONNECTED TO THE EARTH TERMINAL OF EACH FITTING.
  - A SURFACE MOUNTED LIGHT SWITCH WITH NEON INDICATOR SHALL BE POSITIONED ADJACENT TO THE SUBSTATION DOOR.
  - ALL LIGHT SWITCHES SHALL BE MOUNTED AT 1400mm ABOVE FINISHED FLOOR LEVEL.

- POWER**
- ONE DOUBLE 13A SOCKET OUTLET (TO BS 1363) SHALL BE INSTALLED IN ADDITION TO ANY SOCKET IN THE LV CABINET.
  - AN ADDITIONAL SINGLE 13A SOCKET OUTLET (TO BS 1363) SHALL BE INSTALLED, DESIGNATED AND LABELLED AS A TEST EQUIPMENT SOCKET AND SUPPLIED VIA A SEPARATE MCB.
  - ANY RTU/PLTU SHALL BE SUPPLIED BY AN UNSWITCHED FUSE CONNECTION UNIT (TO BS 1363) FUSED AT 5A.
  - RADIAL CIRCUITS SHALL BE USED FOR ALL POWER CIRCUITS.
  - ALL SMALL POWER ACCESSORIES SHOULD BE MOUNTED AT 1000mm ABOVE FINISHED FLOOR LEVEL.

- CABLING**
- ALL CABLES SHALL BE 6491B LSHH TO BS EN 50525-3-41 AND SHALL COMPLY WITH BASEC. ALL INSULATION SHALL USE PHASE OR NEUTRAL COLOURS THROUGHOUT THE LENGTH OF THE CONDUCTOR IN ACCORDANCE WITH BS 7671, NOTE: THE USE OF COLOURED SLEEVES TO MARK CONDUCTORS IS NOT ACCEPTABLE.
  - ALL CABLES SHALL USE STRANDED COPPER CONDUCTORS WITH THE FOLLOWING MINIMUM CROSS SECTIONAL AREA:
    - CUT-OUT UNIT TAILS 25mm<sup>2</sup>.
    - LIGHTING 1.5mm<sup>2</sup>.
    - SMALL POWER 4.0mm<sup>2</sup>.
  - ALL CABLES, EXCEPT ARMoured CABLES AND CUT-OUT TAILS, SHALL BE ENCLOSED IN PLASTIC CONDUIT OR TRUNKING. THE TYPES AND SIZES SHALL BE SUITABLE FOR THE OPERATING CONDITIONS.
  - ALL CABLES SHALL BE INSTALLED WITHOUT JOINTS OTHER THAN AT EQUIPMENT AND TERMINAL FITTINGS.
- CONDUIT, TRUNKING AND TRAYS**
- ALL CABLING SHALL BE INSTALLED IN MINIMUM 20mm CONDUIT SIZED IN ACCORDANCE BS 7671.
  - ALL CONDUIT, BOXES AND FITTINGS SHALL BE HIGH IMPACT, NON-FLAME PROPAGATING, SELF-EXTINGUISHING, HEAVY-DUTY PVC CONDUIT (TO BS EN 61386-1). DIMENSIONS SHALL COMPLY WITH BS EN 60423.
  - THERE SHALL BE SUFFICIENT JUNCTION BOXES, DRAW-IN BOXES AND INSPECTION FITTINGS INSTALLED TO ALLOW CABLES TO BE INSPECTED, WITHDRAWN AND REPLACED IF NECESSARY. THE COMPLETE INSTALLATION SHALL BE ARRANGED USING A LOOP-IN TYPE SYSTEM WITH JOINTS BEING CARRIED OUT AT SWITCHES, ISOLATORS OR APPLIANCE FITTINGS.
  - ALL ADAPTABLE BOXES AND ACCESSORIES SHALL MATCH THE CONDUIT AND SHALL BE FITTED WITH EARTHING TERMINALS.
  - JOINTS BETWEEN CONDUITS MAY BE PUSH-FIT, COMPRESSION, MECHANICAL LOCKING OR SOCKET-END SEALED WITH PVC ADHESIVE. WHERE A WEATHERPROOF OR WATERTIGHT CONNECTION IS REQUIRED PUSH-FIT ARRANGEMENT ALONE IS NOT ACCEPTABLE.
  - ALL CONDUIT SHALL BE SECURED USING MATCHING DISTANCE SADDLES SPACED AT A MAXIMUM DISTANCE OF 750mm AND 200mm FROM ANY BEND, JOINT OR ACCESSORY. ALL BOXES AND ACCESSORIES SHALL BE SECURED INDEPENDENTLY.
  - REFER TO EDS 07-0119 FOR TRUNKING AND CABLE TRAY REQUIREMENTS.

- LABELLING**
- ALL LABELLING SHALL COMPLY WITH BS 7671.
  - ALL DISTRIBUTION BOARD WAYS SHALL BE PERMANENTLY LABELLED TO IDENTIFY CIRCUIT FUNCTION, CABLE SIZE AND PROTECTIVE DEVICE RATING.

- HOT SITES**
- ALL SOCKETS SHALL BE DISCONNECTED OR REMOVED.
  - ALL LIGHTING AND RTU SUPPLIES FROM AUXILIARY TERMINALS SHALL BE VIA AN ISOLATION TRANSFORMER.
  - REFER TO ECS 06-0023 FOR FURTHER INFORMATION.

- TESTING AND CERTIFICATION**
- UPON COMPLETION OF THE WORKS, THE INSTALLATION SHALL BE TESTED IN ACCORDANCE WITH BS 7671, AN ELECTRICAL INSTALLATION CERTIFICATE TOGETHER WITH A SCHEDULE OF TEST RESULTS AS DETAILED IN BS 7671 SHALL BE FORWARDED TO UK POWER NETWORKS.

Version	Date	Description	UA	RDH
			UA	UKPN
			Checked	Dm.
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